APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,272	04/02/2001	Hyun-doo Shin	Q59549	7285

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EXAMINER
HUNG, YUBIN

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/823,272	SHIN ET AL.
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>08 December 2005</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1, 3-8, 10-12</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1, 3-8, 10-12</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>18 January 2005</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some * c) ☐ None of:

        1. ☒ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____.

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Response to Argument

1.   This action is in response to amendment filed 12/8/05, which has been entered.

2.   Claims 2 and 9 have been canceled; claims 1, 3-8 and 10-12 are still pending.

3.   Applicant's arguments filed 12/8/05 have been fully considered but they are not

persuasive; see below.

4.   **In remarks Applicant argued in substance:**

4.1   *that Kothuri does not teach uniform cell (P. 3, line 1)*

However, per the analysis for the rejection of claim 1, this deficiency is disclosed

by Wan.

4.2   *that modifying Wan to have non-uniform cells or modifying Kothuri to have*

uniform cells will produce unsatisfactory results for the intended purpose (P. 3,

3rd paragraph – P. 4, 1st paragraph)

However, in the analysis for the rejection of claim 1, Kothuri was relied upon to

teach recursive partitioning (i.e., quantization) of concentrated cells (i.e., cells

with more feature vectors than a pre-determined threshold) until no such cells

exist. (This in turn results in a hierarchical indexing of the feature vectors); the specific (non-uniform) partition approach was not relied upon to combine the two references. Moreover, one of ordinary skill in the art at the time of the invention would have recognized that the recursive, uniform quantization of the color space can produce comparable, if not better, retrieval result. This is because the further division of a cell containing many feature vectors will offer a more accurate representation of the distribution of the feature vectors. Additionally, while applying uniform partition of Wan to Kothuri is not relied upon in the rejection of claim 1, doing so (as Applicant suggested) will not destroy Kothuri's intended purpose, because it will still result in a hierarchical indexing in which none of the cells are concentrated; the benefit of doing so will be its simplicity (and therefore easier to implement and requires less computing resource), because no computation of the variance and the subsequent sorting of data items are needed.

4.3   *that neither references suggests determining whether concentrated cells exist (P. 4, 2nd and 3rd paragraphs)*

However, as per the analysis for the rejection of claim 1, Kothuri discloses such determination. [See Fig. 5, numerals 506, 518 and Col. 14, line 55 – Col. 15, line 43. Note that each note corresponds to a cell and that *Node Capacity* is a predetermined threshold.]

Claim Rejections - 35 USC § 103

(From Office Action mailed 09/08/2005)

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in
section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
such that the subject matter as a whole would have been obvious at the time the invention was made to a
person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived
by the manner in which the invention was made.

6.   Claims 1, 3, 7, 12, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Wan et al. ("A New Approach to Image Retrieval with Hierarchical Color

Clustering," *IEEE Trans. on Circuits and Systems for Video Technology*, Vol. 8, No. 5,

Sep. 1998, pp. 628-643), in view of Kothuri et al. (US 6,381,605).

7.   Regarding claim 1, and similarly claim 7, Wan discloses

(pa-1)   partitioning the feature vector data space into a plurality of cells having a uniform size
          [P. 631, Section B(1). Note that the feature vector space is the color space (colors of
          the pixels being the feature vectors). Note further that the last three lines of Section
          B(1) suggests further partitioning of the cells]

Wan does not expressly disclose the following limitations; however, Kothuri et al.

teaches/suggests them as indicated below:

(a)   determining whether one or more cells from said plurality of cells, on each of which one
          or more of said plurality of feature vectors are correspondingly concentrated, exist
          [Fig. 5, numerals 506, 518; Col. 14, line 55 – Col. 15, line 43. Note that Node Capacity is
          a predetermined threshold]
(b)   hierarchically indexing the feature vector data space when it is determined that said one
          or more cells, on each of which said one or more of said plurality of feature vectors are
          correspondingly concentrated, exist in the step (a), wherein, one or more feature vectors

are concentrated in a cell when the cell contains more feature vectors than a
predetermined threshold.
[Fig. 5, the loop of refs. 506-522; Col. 3, lines 27-37; Col. 14, lines 55-56. Note that the
recursive portioning of the feature space (see Fig. 5) inherently defines a tree structure
that serves as the hierarchical indexing of the partitioned feature space with each leaf
node corresponds to a cell]

Wan and Kothuri are combinable because they have aspects that are from the

same field of endeavor of image indexing.

At the time of the invention, it would have been obvious to one of ordinary skill in

the art to modify Wan with the teachings Kothuri by hierarchically indexing the feature

space if some cells have more feature vectors than a predetermined threshold. The

motivation would have been to ensure that each cell contains no more feature vectors

than a threshold determined by a parameter of a suitable physical storage device, as

Kothuri indicates in column 3, lines 35-38.

Therefore, it would have been obvious to combine Kothuri with Wan to obtain the

invention as specified in claim 1.

8.   Regarding claim 3, the combined invention of Wan and Kothuri further discloses

- Constructing a histogram illustrating a number of said plurality of feature vectors in each of a
  plurality of cells, including said one or more cells
  [Wan: P. 629, Sect. II.A. Note that the color of a pixel is a feature vector and each cell of a
  partition of the color (i.e., feature) space corresponds to a histogram bin]
- Analyzing a distribution of said plurality of feature vectors using the histogram and determining
  whether said one or more cells, on each of which said one or more of said plurality of feature
  vectors are correspondingly concentrated, exist.
  [Kothuri: Fig. 5, numerals 506, 518. Note that each cell, or node, corresponds to a histogram bin]

9.   Regarding claim 12, and similarly claim 13, Kothuri et al. further discloses using

nearest neighbor query to conduct search [Col. 19, lines 30-39]. Therefore, claim 12 is

rejected per claim 1 and the additional disclosure recited above.

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10.   Claims 4-6, 8, 10 and 11 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Wan et al. ("A New Approach to Image Retrieval with Hierarchical

Color Clustering," *IEEE Trans. on Circuits and Systems for Video Technology*, Vol. 8,

No. 5, Sep. 1998, pp. 628-643) and Kothuri et al. (US 6,381,605) as applied to claims 1,

3, 7, 12, 13 above, and further in view of Weber et al. ("A Quantitative Analysis and

Performance Study for Similarity-Search Methods in High-Dimensional Spaces,"

Proceedings of the 24th International Conference on Very Large Data Base, New York,

August 1998, pp. 194-205).

11.   Regarding claim 4, the combined invention of Wan and Kothuri et al. discloses

everything except for the following limitations. However, Weber et al. teaches/suggests

them as indicated below:

- The indexing method of claim 1, wherein the step (b) comprises the step of indexing the feature
  vector data space using a vector approximation file
  [Section 4.1, lines 1-13]

        The combined invention of Wan and Kothuri is combinable with Weber because

they have aspects that are from the same field of invention of image indexing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined invention of Wan and Kothuri by using VA-file for indexing as taught by Weber in order to overcome the indexing difficulty resulted from increased dimensionality of the feature space.

Therefore, it would have been obvious to combine Weber with Wan and Kothuri to obtain the invention as specified in claim 4.

12.   Claims 5 and 6 are similarly analyzed and rejected as per claims 1 and 4 since Kothuri et al. discloses recursive partition of cells in Figure 5 and Weber et al. teaches approximating the data points (i.e., feature vectors) that fall into each cell with the corresponding VA-file in lines 5-8 of Section 4.1.

13.   Claims 8 and 10 are medium claims of claims 4 and 6, respectively, and are therefore similarly analyzed and rejected.

14.   Claim 11 is a medium claim for the combined method of the methods recited in claims 3-6, respectively, and is therefore similarly analyzed and rejected.

Conclusion and Contact Information

15.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

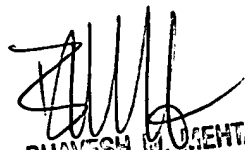than SIX MONTHS from the mailing date of this final action.

16.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Yubin Hung whose telephone number is (571) 272-

7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Patent Examiner
January 13, 2006

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